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Linking vegetation indexes from remote sensing and long-term prospection data to help in the preventative control of desert locust

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Desert Locust management is nowadays done through a preventative control strategy that consists in avoiding populations to reach high densities and a gregarization process leading to uncontrollable swarms. The areas of potential start of the gregarization process for Desert Locust are large and preventative management teams need to prospect all these areas to be efficient. A challenge of ongoing research is to be able to guide on where prospection surveys should be done depending on meteorological and vegetation conditions. An analysis of relationship between long-term prospection data of Desert Locust observations from 2005 to 2009 and spatio-temporal statistics of a vegetation index gathered by remote-sensing was conducted using multiple logistic regressions. The vegetation index was a composite Normalized Difference Vegetation Index (NDVI) given every 16 days and at 250m spatial resolution (MOD13Q1 from MODIS satellite). The statistics extracted from this index were: 1) spatial means at different scales around the prospection point, 2) relative differences of NDVI variation through time before the prospection and 3) large scale summary of vegetation quality. Identical statistics could potentially be computed for actual NDVI. By extrapolation of adequate logistic regression models, maps of probability of presence of locust could be constructed. This methodology should help in focusing prospection toward sensible parts of the gregarization areas at specific times.

Keywords:*Desert locust, remote sensing, population dynamics, logistic regression, vegetation dynamics*